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Appropriate Environmental Adders

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Three views on utility-generated externalities

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"Externalities" are costs imposed on third parties without compensation. Pollution is the archetypical externality. It is the pollution externality that has prompted the emerging national debate over whether public utility regulation should be modified to account for externalities. Jonathan Raab, Myrick Freeman, and Ralph Townsend discuss the arguments surrounding the externality debate. These three authors earlier presented similar material at a Legislative Institute, sponsored by the Margaret Chase Smith Center for Public Policy's Project for the Study of Regulation and the Environment, for the Utilities Committee of the Maine State Legislature.

Appropriate environmental adders

by A. Myrick Freeman, III, Bowdoin College

Introduction

In an ideal world, the problem of externalities from electricity generation would be managed comprehensively, as a component of the larger set of energy and environmental problems. But even within the current framework of separate environmental and utility agencies, there are ways for utility regulators to account for environmental considerations. Utilities and regulators are concerned with the cost and reliability of energy supply, while the environmental agencies are looking at air pollutants and water pollutants. Even if public utility regulators take as given the federal and state environmental policies, they can and should nevertheless look at the environmental implications of new resource acquisition. The logical approach is to use externality "adders," where the adders are based on the marginal damages of competing sources of supply. That damage, in fact, is part of the cost of supplying electricity.

Consider a simple example of two plants, one hydro and one coal, that are bidding to supply the same amount of electricity to the grid. Under present rules, they would bid based on their private costs of production. Suppose that the coal plant costs ten cents, while the hydro is more expensive at twelve cents. But there are externality costs. And let us assume that we can measure the externalities. Suppose that because of high air emissions, environmental costs are four cents for coal, but they are only one cent for the hydro plant. (This might be because of impacts on recreation, for example.) From the perspective of total social costs, the coal plant is the higher cost alternative. To minimize the cost to society, we should pick the hydro plant. That result will occur if the external costs are calculated and included in as adders in the planning process.

The argument for environmental adders

Public utilities commissions should be concerned with the environmental implications of the decisions they make, even though there are other agencies that also examine environmental effects. Using adders in the resource planning process is consistent with least-cost objectives or resource acquisition. Some have argued that commissions should not be concerned with these environmental issues, because the environment is the responsibility of Environmental Protection

Agency and other environmental agencies. But accounting for environmental impacts is consistent with an expanded view of traditional regulatory objectives: that we want to protect the economic welfare of electricity customers. To accomplish that, increments to supply must create the lowest social cost to the society, not just the lowest private cost. Thus, when the air pollution from a generating station leads to poor health, poor health is an important external cost of that generation. A commission is not protecting the customer when it chooses low private costs but high environmental costs. Although rates may be lower, the customers ultimately bear the higher external costs.

How should a commission account for these environmental and external impacts? The only way that is logically consistent with least-cost planning in resource acquisition is that the adder should be based on estimates of environmental damages. Then, how can we calculate these environmental damages? Do we know enough to do it?

Several years ago, the Public Service Commission in New York directed its utilities to study if it would be feasible to estimate the environmental costs from different electricity sources and to incorporate them into least cost planning. After several years of discussion among utilities and the state agencies, a study, of which I am project director, was initiated. The study is at about its mid-point. The utilities and the Electric Power Research Institute have contributed $1.3 million to the project, which is being spent over a three-year period. The objective is to develop a personal computer-based model that estimates site-specific environmental costs. If we are successful, planners will be able to input "coal burning power plant, Central Park West, Manhattan." Within a few minutes, it would provide results that say, in effect, "Don't put it there!" because the external damages will be very high. The planner could then try other fuel sources in the least-cost planning process, and the model would provide estimates of external cost for each source.

In the New York study, we are examining all of the damages and benefits from the entire fuel cycle. This includes the external effects of coal mining and petroleum exploration and also the external costs associated with disposal of fly ash and other wastes. Importantly, the damages (or benefits) are generally location specific. At present, Massachusetts, New York and some other states apply uniform values to a particular generation source within the state. By contrast, we will not develop a table of values, but rather we will develop a model to calculate specific damages and benefits for each source and location. We should seek common methods for defining and measuring the external damages, rather than common values.

Is there really enough data to estimate external costs? In the New York study, we are looking at the literature on the health effects of air pollution, both on mortality and morbidity. This scientific knowledge can be used to estimate the numbers of cases, the various kinds of symptoms and illnesses, and even the excess deaths that are associated with given increases in levels of certain air pollutants. There is also evidence on how much people are willing to pay to avoid these effects and on the economic damages from these adverse affects. We will incorporate that literature into the model. So, yes, I do believe that we will be able to construct meaningful damage estimates.

We do face some formidable obstacles in the calculation of damages from carbon dioxide and the other greenhouse gases. There is a basic lack of technical knowledge and consensus on the natural and physical effects of the increasing concentration of carbon dioxide in the atmosphere. However, it may not be necessary to calculate damages due to climate change. For example, a national or international agreement to cap or to tax carbon dioxide emissions will resolve the problems for utility planning as well. With a cap on emissions globally, any new electricity source would have to buy carbon dioxide permits from someone else. With a cap, there would be no net increase in emissions so marginal damages would be zero. Similarly, if there is a tax based on estimated damages, then the social costs of carbon dioxide emissions would be built into the private cost via the tax structure.

At present, all externality adders are calculated from the costs of abatement. This approach has serious problems, because abatement costs are not good measures of marginal damage. New York and California both have plans to shift from abatement cost calculations to marginal damage calculations. I hope that this trend continues in other states, because it will result in better decisions.

How to incorporate adders

The appropriate way to incorporate the adder depends on how environmental policies are implemented by the environmental agencies. To be precise, the adder used by the utilities should be based on the *additional* environmental damage from the new source that is not already incorporated into the cost of production. In some situations, there will be no net addition to environmental damage from new sources. The best example is the case of sulfur dioxide emissions, because emissions are capped by the Clean Air Act Amendments of 1990. A new coal-burning source with sulfur dioxide emissions would have to buy emission permits from some other source. Even though there may be an increase in sulfur emissions at the new source, there is an offsetting decrease elsewhere. Therefore, there is no net change in environmental damage. A similar situation arises if there is a tax on emissions that is based on the marginal damage. Because the new source already faces the tax on emissions, the marginal damages are already part of the private cost to the utility.

In traditional command-and-control regulations, a utility removes the level of pollutants required by its license. It does not, however, incur any costs for the residual emissions. These residual damages are not incorporated in private decision-making. Therefore, the appropriate adder is the marginal damage of the unabated pollution. Thus, the adder will depend on specific details of environmental policy. The adder approach being adopted in several states is the correct application for pollutants subject to command-and-control regulation.

Conclusion

The use of externality adders in the least-cost planning process by public utilities is an important first step in environmental/utility policy. Adders do not solve all the problems, because they enter only in the choice of which new resources to acquire. The logical next step would be to incorporate analogous adders for dispatch decisions, that is, for the choice of which plants to run

to meet current needs. And there are clearly gains from more comprehensive policies, such as emissions taxes, so that we do not encourage by-pass of the regulated utilities.

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